IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re the Application of: **OHNARI, Hirofumi**

Group Art Unit:**1724**

Serial No.: **09/743,531**

Examiner: **BUSHEY, Charles S.**

Filed: **June 5, 2001**

P.T.O. Confirmation No.: 4037

For: **SWIRLING TYPE MICRO-BUBBLE GENERATING SYSTEM**

SUBMISSION OF APPEAL BRIEF

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

November 2, 2005

Sir:

Submitted herewith is an Appeal Brief in the above-identified U.S. patent application.

Also enclosed is a check in the amount of $250.00 to cover the cost of filing this Appeal Brief. In the event that any additional fees are due with respect to this paper, please charge Deposit Account No. 01-2340.

Respectfully submitted,

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Enclosures: Appeal Brief; and check for $250.00

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APPEAL BRIEF FOR THE APPELLANTS

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Date: November 2, 2005

Atty. Docket No. **010006**

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Appeal No:

In re the Application of: **OHNARI, Hirofumi**

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Examiner: **BUSHEY, Charles S.**

Filed: **June 5, 2001**

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For: **SWIRLING TYPE MICRO-BUBBLE GENERATING SYSTEM**

BRIEF ON APPEAL

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Date: November 2, 2005

Sir:

A Notice of Appeal was filed on June 2, 2005. A Petition for a three month extension of time is attached. A check is attached. Any needed additional fees may be charged to Deposit Account No. 01-2340. This Brief is in response to the final Office Action mailed on December 2, 2004.

REAL PARTY IN INTEREST:

The real party in interest is Hirofumi Onari, 15-20, Jyogaoka 3-chome, Tokuyama-shi, Yamaguchi 745-0807 Japan.

RELATED APPEALS AND INTERFERENCES:

There are no related appeals or interferences.

STATUS OF CLAIMS:

Claims 2-4 and 6-10 are pending in the application. Claims 6 and 7 are withdrawn from consideration. Claims 2-4 and 8-10 stand rejected and on appeal.

STATUS OF AMENDMENTS:

All amendments are entered.

SUMMARY OF INVENTION:

The present invention relates to micro-bubble generating system, comprising a container main unit, a liquid inlet, a gas inlet, and related features. As illustrated in Figure 1(a), gas is sucked through the gas introducing hole 4 into space 1, a swirling gas cavity V is generated, and liquid is guided through liquid inlet 2 directly toward portion 100. As shown in Fig. 3, gas is sucked through gas hole 40 into space 10, and liquid is introduced into space 10 through liquid inlet 20.

In view of the foregoing, the swirling gas is directly impinged by the liquid, and the swirling gas is forcibly cut off and smashed by the liquid, in accordance with the principles of the present invention.

ISSUES:

(i) Whether claims 2, 3(2 or 10), 4(2 or 10), 9, and 10 fail to comply with the written description requirement, pursuant to the first paragraph of 35 USC 112.

(ii) Whether claims 2, 8, and 9 are anticipated pursuant to 35 USC 102(b) by USP 2,653,801 (**Fontein**).

(iii) Whether claims 3(2 or 10), 4(2 or 10), 8, 9, 10 are obvious pursuant to 35 USC 103(a) over USP 2,653,801 (**Fontein**).

GROUPING OF CLAIMS:

Claims 2, 8, 9, and 10 should be considered independently (should not stand or fall together), because claims 2, 8, 9, and 10 set forth different combinations of features. The different combinations of features are shown below.

Claim 2 sets forth a system as follows. Claim 2 sets forth, *inter alia*, "A micro-bubble generating system, comprising a container main unit ... , a pressurized liquid inlet opening ... , a gas introducing hole opening ... , and a swirling gas-liquid mixture outlet opening".

Claim 8 sets forth a method as follows. Claim 8 sets forth, *inter alia*, "A method for micro-bubble generation, using a micro-bubble generating system, which comprises a container main unit ... , a pressurized liquid inlet ... , a gas introducing hole ... , and a swirling gas-liquid mixture outlet ... , whereby said method comprising the steps of: forming a swirling gas cavity ... ; and generating micro-bubbles ... ".

Claim 9 sets forth a method as follows. Claim 9 sets forth, *inter alia*, "A method for micro-bubble generation, using a micro-bubble generating system, which comprises a container main unit ... , a pressurized liquid inlet ... , a gas introducing hole ... , and a swirling gas-liquid mixture outlet ... , whereby said method comprising the steps of: forming a swirling gas cavity ...

; generating micro-bubbles ... ; and continuously cutting off and smashing the swirling gas cavity ... ".

Claim 10 sets forth a system as follows. Claim 10 sets forth, *inter alia*, "A micro-bubble generating system, comprising: a container ... , a container bottom ... , a liquid inlet opening ... , means for injecting pressurized liquid through said liquid inlet opening ... , a gas introducing hole ... ".

ARGUMENTS:

(i) Claims 2, 3(2 or 10), 4(2 or 10), 9, and 10 stand rejected under the first paragraph of 35 USC 112, as failing to comply with the written description requirement.

Appellant respectfully traverses the above rejection of claims 2, 3(2 or 10), 4(2 or 10), 9, and 10 under the first paragraph of 35 USC 112.

Claims 2, 3(2 or 10), 4(2 or 10), 9, and 10 are respectfully believed to comply with the written description requirement.

The above final rejection of claim 10 is improper for at least the following reason. The Examiner did not reject independent claim 10 under the first paragraph of 35 USC 112 in the non-final Office Action mailed May 28, 2004, even though claim 10 sets forth the phrase "directly impinges". Presumably, the Examiner took the position that claim 10, including the use of that phrase in claim 10, did comply with the first paragraph of 35 USC 112. Appellant did not amend claim 10 to add or remove any of the following phrases "by direct impingement", "directly impinging", or "directly impinges" in response to the non-final Office Action mailed May 28,

2004. Then, in the final Office Action mailed December 2, 2004, the Examiner included a new rejection of claim 10 under the first paragraph of 35 USC 112 relating to the above phrases. Appellant was not adequately put on notice that the use of "directly impinges" in claim 10 was believed by the Examiner to be not in compliance with the written description requirement. In view of the above, Appellant respectfully submits that this final rejection of claim 10 is improper and should be withdrawn.

As illustrated in Figure 3, liquid inlet 20 guides liquid "directly" to space 10. In other words, liquid from liquid inlet 20 directly impinges on space 10. "Direct impingement" is called for by the structure illustrated in Figure 3.

Figure 1(a) depicts gas cavity V in a string-like shape, and shows that liquid inlet 2 causes liquid to directly impinge on portion 100. According to the disclosure of the present invention, a "direct impingement" is called for because the swirling gas cavity is described as being "forcibly cut off and smashed" .

The phrases "by direct impingement", "directly impinging", and "directly impinges" conform to the written description requirement.

Appellant respectfully submits that claims 2, 3(2 or 10), 4(2 or 10), 9, and 10 comply with the written description requirement.

Thus, in view of the foregoing, Appellant respectfully submits that the rejection of claims 2, 3(2 or 10), 4(2 or 10), 9, and 10 under the first paragraph of 35 USC 112 is improper and should be withdrawn.

(ii) and **(iii)** Claims 2, 8, and 9 stand rejected under 35 USC 102(b) as anticipated by USP 2,653,801 (**Fontein**). Claims 3(2 or 10), 4(2 or 10), 8, 9, and 10 stand rejected under 35 USC 103(a) as obvious over USP 2,653,801 (**Fontein**).

Appellant respectfully traverses the above rejections of claims 2, 3(2 or 10), 4(2 or 10), 8, 9, and 10.

The Examiner cites and relies upon the following drawings of **Fontein**: Figures 1, 2, 4a, and 4b. Figure 1 of **Fontein** shows that the walls of the suction pipe 8 extend all the way down to a position disposed between feed aperture 2 and an interior region of suction pipe 8. Thus, there is a physical barrier located between feed aperture 2 and the interior region of suction pipe 8. In the configuration disclosed by Figure 1 of **Fontein**, material that travels through feed pipe 1 and feed aperture 2 cannot "forcibly cut off and smash" swirling gas, in accordance with the principles of the present invention. Furthermore, in the configuration disclosed by Figure 1 of **Fontein**, material that travels through feed pipe 1 and feed aperture 2 cannot "directly impinge" on swirling gas, in accordance with the principles of the present invention.

Figure 2 of **Fontein** shows that the walls of the nozzle 9 extend all the way up to a position disposed between feed aperture 2a and an interior region of nozzle 9. Thus, there is a physical barrier located between feed aperture 2a and the interior region of nozzle 9. In the configuration disclosed by Figure 2 of **Fontein**, material that travels through feed pipe 1a and feed aperture 2a cannot "forcibly cut off and smash" swirling gas, in accordance with the principles of the present invention. Furthermore, in the configuration disclosed by Figure 2 of **Fontein**, material that travels through feed pipe 1a and feed aperture 2a cannot "directly impinge" on swirling gas, in accordance with the principles of the present invention.

Figures 4a and 4b of **Fontein** show that the walls of the nozzle 9b extend all the way over to a position disposed between feed aperture 2b and an interior region of nozzle 9b. Thus, there is a physical barrier located between feed aperture 2b and the interior region of nozzle 9b. In the configuration disclosed by Figures 4a and 4b of **Fontein**, material that travels through feed pipe 1b and feed aperture 2b cannot "forcibly cut off and smash" swirling gas, in accordance with the principles of the present invention. Furthermore, in the configuration disclosed by Figures 4a and 4b of **Fontein**, material that travels through feed pipe 1b and feed aperture 2b cannot "directly impinge" on swirling gas, in accordance with the principles of the present invention.

Fontein fails to describe, teach, or suggest the following features of claim 2: "a gas introducing hole opening at one end of said frusto-conical space to generate a swirling gas that is **forcibly cut off and smashed by direct impingement** by swirling pressurized liquid introduced through said liquid inlet", in combination with the other claimed features (emphasis added).

Fontein fails to describe, teach, or suggest the following features of claim 8: "generating micro-bubbles by **forcibly cutting off and smashing** the swirling gas cavity with swirling pressurized liquid to generate a difference of swirling velocity between the gas and liquid portions in the swirling gas cavity", in combination with the other claimed features (emphasis added).

Fontein fails to describe, teach, or suggest the following features of claim 9: "generating micro-bubbles by **forcibly cutting off and directly impinging** the swirling gas cavity with swirling pressurized liquid to generate a difference of swirling velocity between the portions in the swirling gas cavity", in combination with the other claimed features (emphasis added).

Fontein fails to describe, teach, or suggest the following features of claim 10, as amended: "wherein said swirling pressurized liquid introduced through said pressurized liquid inlet directly impinges on said narrow swirling gas flow stream", in combination with the other claimed features.

Thus, Appellant respectfully submits that the above rejections of claims 2, 3(2 or 10), 4(2 or 10), 8, 9, and 10 are improper and should be withdrawn.

For the reasons above, the rejections should be reversed, which is respectfully requested.

In the event this paper is not timely filed, Appellant hereby petitions for an appropriate extension of time. The fee for any such extension may be charged to our Deposit Account No. 01-2340, along with any other additional fees which may be required with respect to this paper.

Respectfully submitted,

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Enclosure: Appendix

APPENDIX: LISTING OF CLAIMS

Claim 1 (Canceled).

Claim 2 (Previously Presented): A micro-bubble generating system, comprising a container main unit having an interior space of frusto-conical shape and being closed at one end, a pressurized liquid inlet opening communicating tangentially with said interior space, a gas introducing hole opening at one end of said frusto-conical space to generate a swirling gas that is forcibly cut off and smashed by direct impingement by swirling pressurized liquid introduced through said liquid inlet, and a swirling gas-liquid mixture outlet opening at the other end of said interior space and operative to discharge micro-bubbles therefrom.

Claim 3 (Previously Presented): A micro-bubble generating system according to one of claims 2 or 10, wherein a plurality of pressurized liquid inlet openings are tangentially disposed on a part of a circumferential surface of the container and communicate at spaced locations about the circumference of the container wall with the interior space.

Claim 4 (Previously Presented): A micro-bubble generating system according to one of claims 2 or 10, wherein said pressurized liquid inlet opening opens on a part of the circumferential surface of the container near said gas-mixture outlet from said interior space.

Claim 5 (Canceled).

Claim 6 (Withdrawn): A micro-bubble generating system according to one of claims 1 or 2, wherein a baffle plate is arranged closely spaced from the swirling gas-liquid mixture outlet from the interior space.

Claim 7 (Withdrawn): A micro-bubble generating system according to one of claims 1 or 2, wherein a partition plate for closing the outlet is attached, leaving only a partial opening defining the swirling gas-liquid mixture outlet from the interior space.

Claim 8 (Previously Presented): A method for micro-bubble generation, using a micro-bubble generating system, which comprises a container main unit having an interior space with a bottom, a pressurized liquid inlet opened in a tangential direction on a part of a circumferential surface of an inner wall of the space, a gas introducing hole opened at the bottom of the interior space, and a swirling gas-liquid mixture outlet opened at a mixture discharge end of the interior space, whereby said method comprising the steps of:

forming a swirling gas cavity along which self-sucked gas is swirled and guided while flowing in a narrow stream of swirling gas flow in the interior space; and

generating micro-bubbles by forcibly cutting off and smashing the swirling gas cavity with swirling pressurized liquid to generate a difference of swirling velocity between the gas and liquid portions in the swirling gas cavity.

Claim 9 (Previously Presented): A method for micro-bubble generation, using a micro-bubble generating system, which comprises a container main unit having an interior space with a bottom, a pressurized liquid inlet opened in a tangential direction on a part of a circumferential surface of an inner wall of the space, a gas introducing hole opened at the bottom of the interior space, and a swirling gas-liquid mixture outlet opened at a mixture discharge end of the interior space, whereby said method comprising the steps of:

forming a swirling gas cavity for swirling and guiding self-sucked gas along a narrow gas flow stream in the interior space;

generating micro-bubbles by forcibly cutting off and directly impinging the swirling gas cavity with swirling pressurized liquid to generate a difference of swirling velocity between the portions in the swirling gas cavity; and

continuously cutting off and smashing the swirling gas cavity in said interior space to generate a relative increase of the difference in rotating velocity between a rotating cut-off portion and impinged portion in the second step, the liquid passing through the rotating cut-off portion of gas cavity being rapidly diffused while the diffused rotating gas fluid mixture is stably formed and an angle of diffusion of the rotating mixture is large, and wherein a difference of rotating velocity between gas and liquid streams is relatively increased between the rotating cut-off portion and the smashing impinged portion of the swirling gas cavity portion.

Claim 10 (Previously Presented): A micro-bubble generating system, comprising:

a container having an interior space defined by a surface of revolution,

a container bottom closing said space at one axial end thereof and a gas-liquid mixture outlet opening at the other end thereof,

a liquid inlet opening communicating tangentially with said interior space adjacent said gas-liquid mixture outlet opening,

means for injecting pressurized liquid through said liquid inlet opening as a centrifugally flowing fluid into said interior space,

a gas introducing hole disposed in the container bottom and operative to introduce gas into said interior space, said stream of gas being induced to swirl as a narrow low pressure flow stream in said interior space by said centrifugally flowing liquid,

wherein said swirling pressurized liquid introduced through said pressurized liquid inlet directly impinges on said narrow swirling gas flow stream adjacent said gas-liquid mixture outlet to tear down said swirling gas flow stream and thereby generate micro-bubbles for discharge from said gas-liquid mixture outlet opening.